

## **REMARKS/ARGUMENTS**

Claims 1 - 7, and 9 - 21, and 23 - 24 remain in the application. Claims 8, 22, and 25 - 34 have been cancelled.

Examiner Kennedy is thanked for carefully reviewing the subject patent application. All claims under consideration are now believed to be in allowable condition, and allowance is so requested.

Claims 1 and 11 were amended to point out that the main purpose of the claimed invention is to control the thickness of the cap layer in the MTJ elements since the cap layer thickness uniformity has a direct bearing on the switching field performance of the plurality of MTJ elements. The Applicants submit that no new information has been disclosed in the amended claims since the words that were added to the claims have an antecedent basis in the specification.

### **I. Rejection under 35 U.S.C. 103 (a)**

Reconsideration of the rejection of claims 1 - 24 under 35 USC 103 (a) as being unpatentable over Applicants admitted prior art (AAPA) in view of Huang et al. (U.S. Patent 5,747,382) and Park (U.S. Patent 6,025,223) is requested, in light of the following.

In response to the Examiner's comments in the second paragraph of the Continuation Sheet, the Applicants respectfully submit that neither AAPA, Huang, nor Park teach a method controlling a cap layer thickness to within +/- 5 Angstroms. Those skilled

in the art recognize that the  $\pm 5\%$  uniformity across the wafer referred to by Huang in column 3, lines 18 - 21 applies only to the layer being etched and not to other layers that might be exposed in the process. For example, etch processes often result in a substrate with considerable topography as in trench or via etching where removal of the material from the trench or via occurs with  $\pm 5\%$  uniformity but the "topographical" uniformity of all features on the substrate is much greater than  $\pm 5\%$ . In other words, the layer being removed with a high etch rate may or may not end up with a thickness similar to one or more layers that have a low etch rate and which experience minimal thickness loss. However, the RIE uniformity of the etch may be  $\pm 5\%$  even though a planarity across the wafer is not achieved. Thus, the thickness uniformity of an exposed layer (i.e. cap layer) with high etch resistance should not be confused with the etch uniformity of an IMD layer with low etch resistance as described in Huang. Furthermore, the AAPA states on page 4, lines 11 - 14, that the cap layer thickness cannot be adequately controlled with a CMP method. Although Park mentions a method of etching an insulating layer having a thickness sufficient to cover a second dielectric layer, Park does not provide any parameters to suggest a value for the "sufficient thickness" or the extent to which the etch should be performed to reach an undefined step difference B. Therefore, Park does not teach a method to control a cap layer thickness to within  $\pm 5$  Angstroms.

The Applicants respectfully submit that none of the applied or known references address the claimed invention as described in claims 1 to 7, 8 to 21, and 23, 24 in which an MRAM cell is fabricated with an MTJ element that has a cap layer thickness controlled to within  $\pm 5$  Angstroms. The claimed invention is believed to be patentable over the

prior art cited, as it is respectfully suggested that the combination of the AAPA, Huang, and Park references does not teach a method to control the cap layer thickness in an MTJ within an MRAM cell. Applicant has claimed his process in detail. The processes of FIGS. 5 - 11 (claims 1 - 7, 9-21, 23, 24) are believed to be novel and patentable over the applied references. We therefore request Examiner Kennedy to reconsider her objection in view of the aforementioned arguments.

Since independent claims 1 and 11 are now believed to be patentable, the dependent claims 2 - 7, 9, 10, 12 - 21, and 23 - 24 are believed to be patentable. All claims are now believed to be in condition for allowance, and allowance is so requested.

It is requested that should there be any problems with this Amendment, please call the undersigned Attorney at (845) 452-5863.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'SBA', with a stylized flourish extending from the end.

Stephen B. Ackerman, Reg. No. 37,761